ONTARIO BEEKEEPERS' ASSOCIATION
Since 1881

Submission to Ontario's draft Pollinator Health Action Plan
EBR Registry # 012-6393

SETTING THE STAGE

The Ontario Beekeepers' Association applauds the Government of Ontario's foresight and initiative in promoting pollinator health. The OBA fully support the vision for Ontario's Pollinator Health Action Plan and will work closely with OMAFRA to ensure "*Ontario is home to healthy pollinator populations"*.

We are receptive to most of the recommendations to the draft plan; there are, however, some areas where the plan can be improved and enhanced in order to ensure a sustainable, positive impact on pollinator health. The OBA enjoys a positive and collaborative working relationship with OMAFRA, and we offer our commentary and recommendations in this spirit of collaboration.

The OBA represents the over 3,000 beekeepers who manage honey bees in more than 100,000 colonies located throughout Ontario. Honey bees represent a large group of insect pollinators and are the focus of an agricultural industry that produces honey and hive products, and provides pollination services essential to the production of Ontario-grown fruit and vegetables.

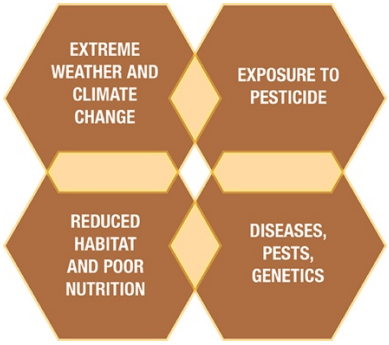
Ontario honey bees live and work in the same environment and are subject to many of the same stressors as bumble bees and wild bees. Honey bees are different from other pollinators, however, in that as a 'domesticated' pollinator, beekeepers actively manage the health of their colonies and if necessary, they can - at a cost - replace weak or failing hives. Because honey bee populations and their health are closely monitored by beekeepers, the effects of specific stressors can be quickly identified and resolved through hive inspections. As well, mortality is tracked and trended over time through provincial statistical reporting. Unfortunately, much less is known about the health and population trends of wild bees and other insect pollinators. So while the 'canary in the coal mine' analogy may not be perfect, honey bee health and mortality are currently our best indicators of the overall condition of Ontario's insect pollinators.

In the past 10 years, Ontario beekeepers have observed a decline in the health of the honey bees they manage. Indicators of decline include historically high overwinter and mid-season mortality rates, and an excessive need to replace failed queens whose production determines the population and productivity of the hive. In the two most

recent winters, honey bees have suffered 58% and 38% overwinter losses[i] while the importation of queens to replace failed queens has reached record levels.

WHAT IS REALLY THREATENING ONTARIO POLLINATORS

The concept of honey bee decline attributed to multiple stressors identified in Ontario's Pollinator Health Plan has been put forward to explain Ontario's sharp decline in pollinator populations.

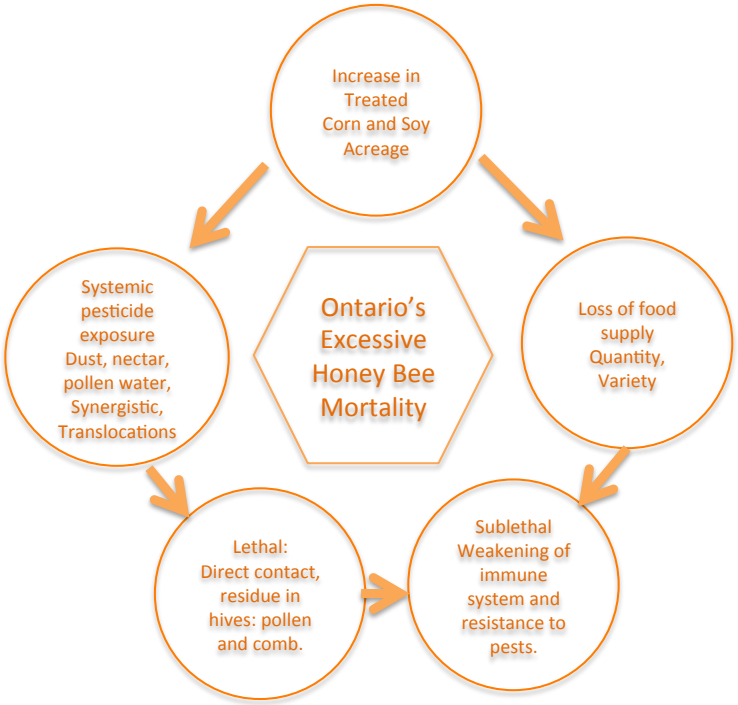


This model, referring to a complex interdependent system of stressors, does not adequately explain the current steep decline in Ontario's pollinator population.

For as long as honey bees have been managed, they have been subject to debilitating diseases and destructive pests. Beekeepers have adopted treatments and practices that allow them to maintain colony health and sustainable mortality levels. In the mid-1990's,*Varroa destructor* mites were discovered in Ontario hives threatening to destroy Ontario's beekeeping industry. While *varroa* continues to be a serious threat to bee health, beekeepers have developed multiple management techniques to manage *varroa* and continue to maintain productive colonies. [ii]

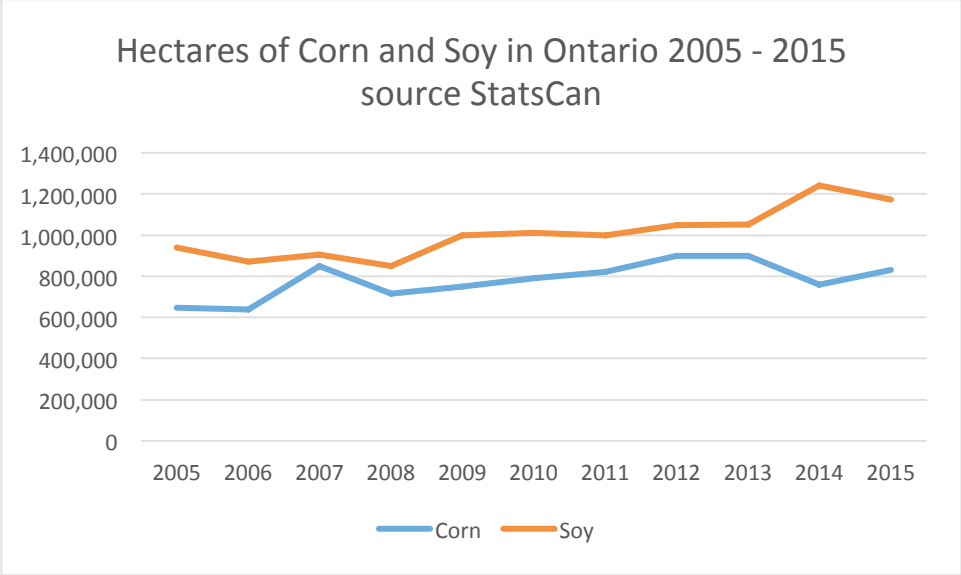
Cold, long winters, snow cover and highly variable seasonal temperature and weather conditions define the challenging working environment of an Ontario beekeeper. However, honey bees with good colony management practices adapt well to Ontario's climate. Despite snow cover, extreme cold and spring weather variations, Ontario beekeepers had, up until recently, successfully overwintered healthy colonies, containing losses to within the range of 15% – 20%.

Based on beekeepers' direct experiences and observations, corroborated by field testing and the overwhelming amount of peer reviewed science-based research[iii], the **OBA concludes that the recent decline of Ontario honey bees can be traced to recent changes in agricultural practices on Ontario's farmlands.**



In the past 10 years, a sharp decline of honey bees in Ontario has coincided with the significant increase in hectares of corn and soy employing the practice of no-till farming using herbicides, and planting seeds treated with systemic pesticides and fungicides.

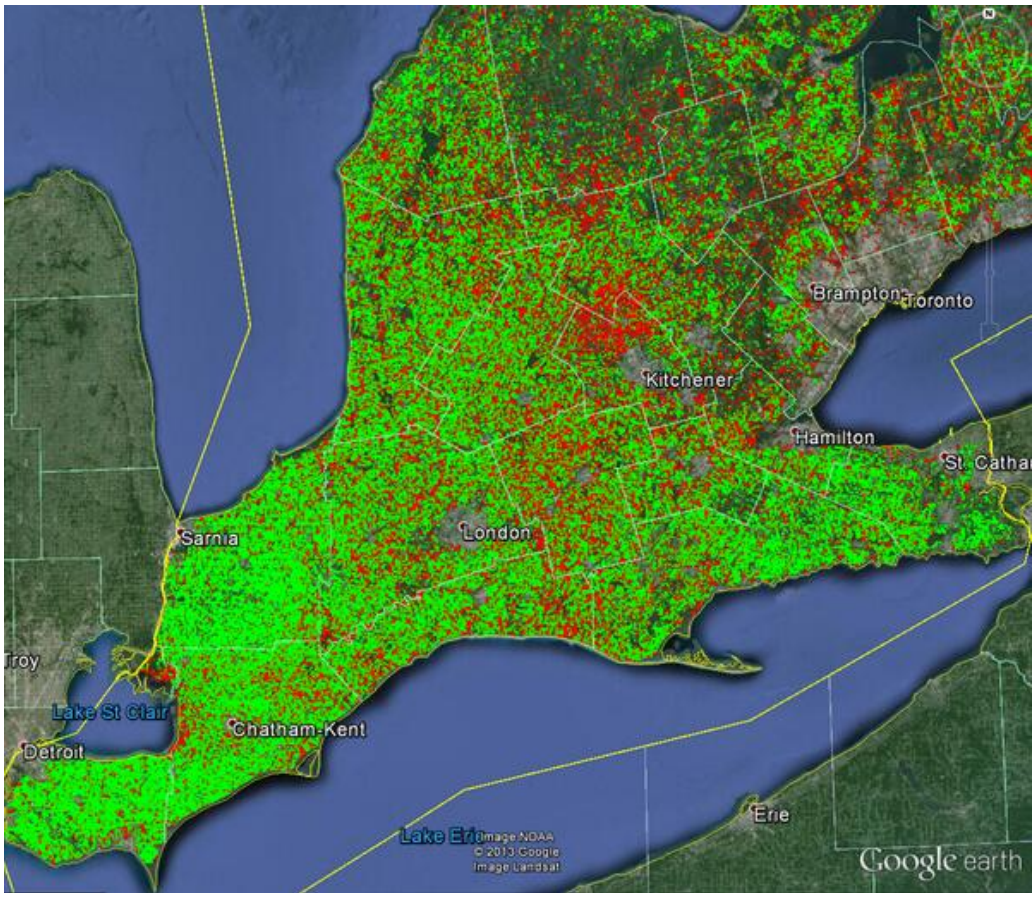
Corn and soy dominate field crops in Ontario, and over 60% of Canada's corn and soy crops are grown in Ontario[iv]. Since 2005, there has been a 28% increase in farmland planted in corn and 24% more hectares of soy grown in Ontario[v] [vi].



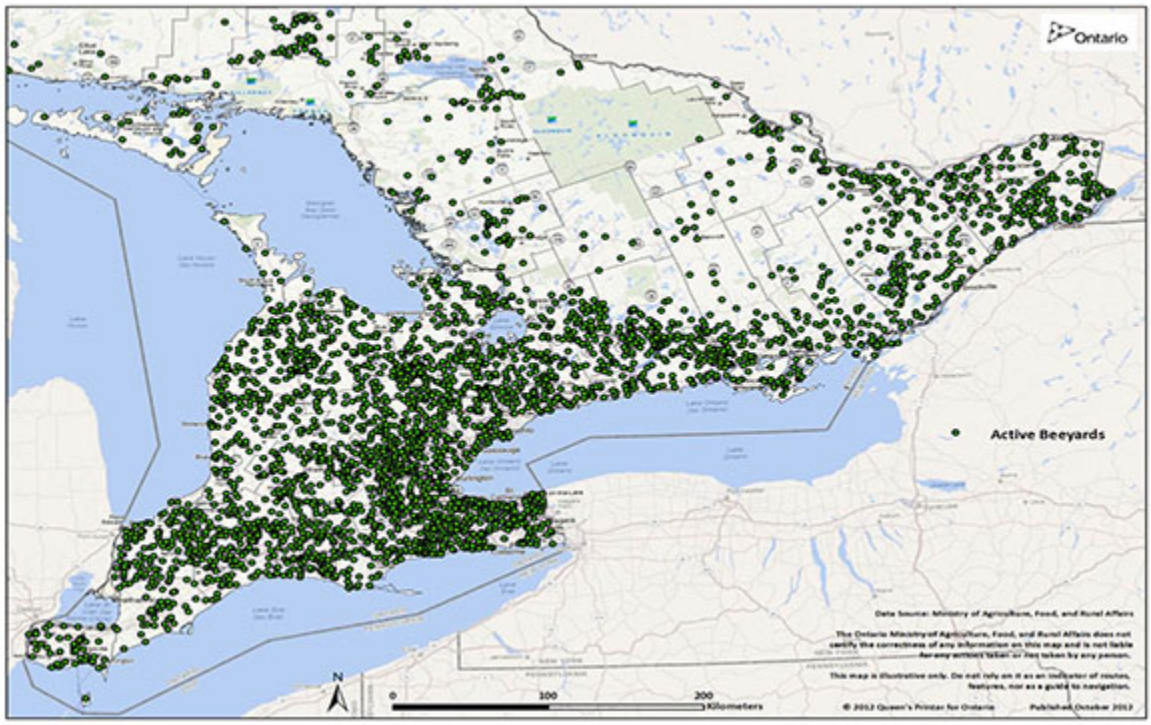
The $520-million Ontario Ethanol Growth Fund (OEGF) was launched in 2005 following the announcement of the Ethanol in Gasoline Regulation, requiring an average of at least five per cent ethanol in all gasoline sold.

As such, government ethanol policies have also created a new, and subsidized, market demand for feed grains. Today 30% of Ontario's corn production is now allocated to ethanol making it likely that the increase of 28% of grain corn plantings was stimulated by corn price subsidies from the Ontario Ethanol Growth Fund due to expire in 2017.

The impact of the expansion of corn and soy on beekeeping in Ontario is demonstrated by the maps below that show a close correlation between acreage of corn (red) and soy (green) and traditional beekeeping areas in south central and southwestern Ontario[vii] [viii]. Ontario has also experienced expansion of corn and soy plantings farther north, coincident with the development of new hybrids that require less heat units.



Corn (green) and Soy cropping in south western Ontario 2013.



Concentration of bee yards in Ontario 2013

The boom in Ontario corn and soy has seen the cash cropping of once marginal land that, as pasture or uncultivated land, was a source of resources (pollen, nectar and water) for all insect pollinators. Once rotated with clover or alfalfa hay, farmers now plant their lands with corn-on-corn rotation or corn, soy and winter wheat – all crops that are not nectar-producing but also carry seed-treated systemic pesticides.

In this new system of cash cropping, systemic pesticides such as the neonicotinoids prophylactically applied to corn, soy and winter wheat represent some of the most toxic pesticides used in agriculture today. Adding to the problem is the fact that the current practice of mixing insecticides and fungicides in seed treatments increases their neuro-toxicity, making them even more lethal to bees[ix].

The impact of systemics, a new class of pesticides that includes neonicotinoids, on pollinator health is significant. The effects of exposure to neuro-toxic systemics such as neonicotinoids was first observed by Ontario beekeepers as piles of dead bees at the hive entrance, unusually high winter losses, less populous hives, fewer worker bees in the fall, spotty brood patterns and failing queens. Subsequently, research has confirmed the linkage of bee health decline to neonicotinoid seed treatments[x].

Neonicotinoids now represent the world's largest selling pesticides. Excessive overuse of systemic pesticides has been cited by scientists around the world[xi] as the primary source of pollinator mortality. According to PMRA, exposure to neonicotinoid pesticide on

treated corn and soy seeds in Ontario was the source of bee kills in 2012 and 2013, and PMRA deemed their continued use in agriculture as "*unsustainable*"[xii].

The first global assessment of pollinators - a two-year study conducted and released recently by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services[xiii] concluded:

"The assessment found that pesticides, including neonicotinoid insecticides, threaten pollinators worldwide, although the long-term effects are still unknown.
"Thematic Assessment of Pollinators, Pollination and Food Production, IPBES February 26, 2016.

Direct contact with systemic pesticides via dust abrading from seeds at planting time can kill bees foraging anywhere near fields during planting time. While diffusors and seed coatings have reduced the spread of dust outside of target areas, they have not eliminated the threat to bees, and have had the effect of concentrating the pesticide in the remaining dust resulting in similar exposure to neonicotinoids at planting and contamination of plants, shrubs and trees adjacent to crop areas[xiv] [xv].

Sublethal effects of pesticide exposure on bees have been well documented. Bees that do not die outright from direct exposure to systemics carry toxic pesticide via pollen and nectar into the hive[xvi]. They will be exposed to pesticides many times over a long period as the hive stores and consumes these resources. Chronic exposure to lower levels of neonicotinoids via nectar, pollen and comb have been shown to affect honey bees' ability to resist disease[xvii] and pests like *varroa* and to navigate to and from the hive,[xviii] resulting in smaller or even empty hives: a symptom of neonicotinoid poisoning that was once called colony collapse disorder[xix].

HABITAT IMPROVEMENT STARTS WITH SYSTEMIC PESTICIDE REDUCTION

The unique translocation of water-soluble systemic pesticides in soil and water from croplands to other areas must be addressed before any habitat improvement actions can be taken.

Only 20% of systemic pesticides applied to seeds travel to the target plant. The remaining 80% of a systemic pesticide seed application dissolves into the soil[xx] and can be present in puddles in the field visited by bees or are moved via groundwater[xxi] to other areas, often kilometres away from the planting area[xxii]. Studies suggest residue from the pesticides will migrate to wild flowers that are not even near the target crops. In Quebec, the testing of waterways in areas of intense corn farming found traces of neonicotinoids in every stream and river tested.

Other studies in western provinces show traces of neonicotinoids in prairie wetlands far from croplands[xxiii]. Any insect pollinator that forages for water in pools, puddles and wet soil or on flowering plants outside of the target crop area will be subject to both lethal and sublethal doses of neonicotinoids.

Habitat restoration should be delayed in any areas where treated neonicotinoid treated corn, soy or winter wheat are or have been grown until the target area is deemed safe for pollinators.

The unique translocation potential of systemic pesticides must be considered in any discussion about planting bee-attracting forage on land such as roadside strips, rail or hydro rural right of ways adjacent to or near land with systemic pesticide residues at levels that would be lethal to pollinators. Attracting bees to these areas could result in potentially toxic exposure from contact with contaminated nectar, pollen, water, or wet soil and may have the unintended effect of creating pollinator 'kill zones'. Until there is a change to current farm practices of growing corn and soy on marginal lands, and until we see a significant reduction in acreage planted with seeds treated with systemics and fungicides, there will be few 'safe' areas for improving bee forage in, or adjacent to, Ontario cropland.

Further, while Ontario regulations should significantly reduce the amount of treated corn and soy seeds planted throughout the province, there is a need to determine the toxicity levels of neonicotinoid residues remaining in these environments. Ideally, after the regulations reduce the overuse of systemics to their 15% target level, Ontario will be able to identify safe areas where habitat restoration activities will create ever-expanding areas of pollinator friendly zones.

As it stands today, urban and non-corn and -soy cropland are probably the safest places for bees in Ontario. Because of Ontario's ban on cosmetic pesticides, Ontario cities are relatively safe havens for bees and other pollinators. Urban beekeeping should be encouraged and the 30-meter restrictions should be relaxed to allow more urban beekeeping, hopefully stimulating the development of bee friendly plantings in urban spaces.

THE WAY FORWARD IS CLEAR

Ontario's new systemic pesticide regulations represent an important first step toward achieving its goal of being Canada's leader in pollinator protection. This is important because our experience with honey bees tells us that *all* insect pollinators are under intense pressure due to the rapid expansion of cash cropping of corn, soy and winter wheat in Ontario. We understand the temptation to take positive steps in creating pollinator garden spaces and enhanced pollinator friendly plantings; however, the larger problem of the overuse of highly toxic pesticides must be addressed before Ontario can make the claim to be home to healthy pollinator populations.

OBA'S SPECIFIC RECOMMENDATIONS:

In the following section, we put forward recommended actions for the Government of Ontario that will ensure Ontario's Pollinator Health Plan maximizes its positive impact on both managed and wild pollinators:

Annual Review of the Plan

1. *Within one year after implementation, invite stakeholders back for a consultation session to review progress and comment on actions taken or needed.*

Habitat Improvement

2. *Follow through on the promise to reduce the use of neonicotinoids on corn and soy acreage by 85% by 2017. It is not acceptable for these goals to be 'aspirational', they must be real.*

3. *Broaden class 12 pesticides to include all new systemics on field crops, as we know that additional systemics are entering the distribution pipeline*

4. *Review the current use of systemic pesticides on vegetable crops, flowers and plants sold in Ontario for their direct impact on pollinators and the spread of neurotoxicity via residues in plant soils.*

5. *Close the loopholes allowing the continued application of systemic pesticides as foliar sprays on fields where farmers did not get permission to use seed treatments.*

6. *Allow Ontario's Ethanol Growth fund to lapse, and end market subsidies that artificially encourage expansion of corn growing areas. Reinvest those funds in pollinator health.*

7. *Incentivize farmers to restore or rotate marginal farmland back to clover/alfalfa hay and other bee friendly crops.*

8. *Establish an ongoing monitoring and reporting system to trace pesticide levels in soil and water throughout Ontario on farm and non-farmland. Establish standards that set both lethal and sublethal limits for pesticide residues prior to habitat restoration.*

9. *Urge lawn seed suppliers and retailers to add white clover to their lawn grass mix.*

10. *Do not partner with the Pollinator Partnership. There are many worthy Canadian- NGOs that would be more appropriate partners. (Frankly, we find the mention of them in OMAFRA's draft Plan puzzling and question the rationale for this.) The Pollinator Partnership is a U.S.-based organization that accepts funding from the pesticide industry and holds views at odds with Ontario's neonicotinoid restriction policy and the conclusions of scientists and the PMRA in regard to the harmful effect of neonicotinoids on bee health. They are admittedly in conflict with the primacy of reducing pesticide use before habitats can be created.* "it may take years to determine the veracity of lethal and sub-lethal impacts of neonicotinoids." From: A Message from the Executive Director on CCD and Neonicotinoids [xxiv]

Bees and Beekeeping

11. *Create a new position of Director, Pollinator Health to be the advocate for bee health and coordinated actions on behalf of pollinator health protection. Ideally this position will draw on resources from MOECC and OMAFRA with input from MNR and MAH.*

12. *Do not require mandatory training for beekeepers. This is an inefficient way to improve beekeeping practices. Beekeeping practices in Ontario are among the best in any province, given OMAFRA's world class inspection program, OMAFRA support of an expanded OBA tech transfer programs (TTP) and OMAFRA's ongoing close collaboration with beekeepers on managed bee health issues. Mandatory training is tantamount to licensing and will be difficult to enforce, it would be a barrier for new beekeepers and could drive some beekeepers to avoid registering their hives. The OBA supports IPM for beekeepers but does not consider their use a farm safety issue requiring mandatory training.*

13. *Rescind the 30-meter property line restrictions to provide more flexibility on the placement of hives in rural areas and give municipalities the ability to expand managed colony placement in urban areas.*

14. *Continue to fully support OBA's world-class Tech Transfer knowledge transfer program. Beekeeping education is the single most important contribution to BMP compliance. Workshop and web-based learning engenders better beekeeping management practices including IPM training, which translates to improvements in honey bee health.*

15. *Consider an expanded role for bee inspectors as bee health field advisors for beekeepers. This is a natural extension of their inspection duties.*

16. *Support research projects that encourage cost-effective ways to improve beekeeping practices and bee health such as freeze units and indoor climate-controlled overwintering of honey bees.*

17. *Recognize the new Niagara College Commercial Beekeeping course as a knowledge centre for commercial beekeeper education and applied research into beekeeping and pollination BMPs. Additional on-campus and distance learning courses may be offered via OBA TTP through this learning centre for upgrading commercial beekeeping skills.*

18. *Establish, in partnership with the OBA and academia, a science based stakeholder group - the **Ontario Bee Health Advisory Group**. The Government of Ontario needs an advisory group that is knowledgeable about bee health and an advocate of pollinator health. The OBHAG would be Ontario-focused to include beekeepers and independent research from all areas of the province. It will serve as an invaluable expert resource for OMAFRA for reviewing policy and pollinator health initiatives and to develop a multi-year research agenda.*

19. *Ontario officials should resign from the National Bee Health Roundtable until it has a clear mandate inclusive of issues endemic to Ontario and Quebec and it is reconstituted to include OBA beekeepers. Currently the Roundtable has representation from GFO, Crop Life and pesticide manufacturers. Yet, even after repeated requests, Ontario beekeepers, who have the most to contribute to such an organization, have been excluded from this roundtable. Ontario leads Canada in pollinator health action and should not legitimize this misguided organization.*

20. *Following # 15, initiate an accord for Eastern Canada beekeeping inclusive of Quebec and Ontario and invite the Trudeau Government to an annual symposium or forum to discuss common pollinator, pollination and bee health concerns that require federal-provincial cooperation. Ontario and Quebec share similar regional bee health issues that are markedly different from those of Western Canada or the Atlantic provinces and are already cooperating on a number of issues.*

21. *Support urban beekeeping and pollinator gardens in public spaces, backyards and rooftops as well as efforts to build pollinator structures for bumble bees and wild bees. Urban beekeeping helps Ontario citizens living in cities to be more aware of the benefits of insect pollinators.*

22. *Support independent research on bee health issues including impacts of stressors on bee health and better surveillance of wild bee populations. To make better decisions on pollinator health, we need research that is not*

funded by those who are dependent on ag/chem funding and who may have a vested interest in the results.

Public awareness and education

23. *Create an overarching brand and brand identity that stands for pollinator appreciation and pollinator health action. This brand will serve as the connective tissue that synergizes all partner and OMAFRA activities promoting pollinator health*

24. *Consider public outreach and stakeholder engagement to create awareness and appreciation among the general public for the role that pollinators play in improving quality of life in Ontario such as:*
    a. *Declaration of Ontario Pollinator Appreciation week and program activities throughout the province.*
    b. *Creation and announcement of Ontario license plates celebrating honey bees and wild pollinators.*
    c. *A pollinator instructional science module for Ontario elementary school teachers with attendant materials for class instruction including school tours of bee yards.*
    d. *Deployment of youth scientists and a smart phone app to count wild bees butterflies and bumble bees.*
    e. *Create and manage pollinator health displays at country fairs, exhibitions, home and garden shows.*
    f. *Partner with associations to create point of purchase display and information materials for seed and plant retailers to identify and encourage bee friendly plantings around homes and buildings.*
    g. *Partners with food retailers to display signage and information materials in fresh food sections that highlight Ontario foods that benefit from insect pollinators. Instruct Foodland to include this in their promotion of Ontario-grown foods.*
    h. *Rather than a specific provincially orchestrated contest, consider a call for proposals to allow community groups and NGOS to conceptualize innovative initiatives to create pollinator friendly spaces or to inform and educate citizens on the importance of pollinator health.*

Submitted by the Ontario Beekeepers' Association, February 29, 2016

[i] http://www.omafra.gov.on.ca/english/food/inspection/bees/2015winterloss.htm

[ii] "*The level of varroa mite infestation observed at commercial beekeeping operations (50 colonies or greater) was below established treatment thresholds throughout the season (Fig. 1) and indicates that beekeepers have had success in managing this pest. Field inspections in 2013 also indicated levels of varroa infestation below the treatment threshold. This suggests that many commercial beekeepers were able to maintain varroa levels below damaging levels due to effective management strategies. The level of varroa infestation at non-commercial operations (fewer than 50 colonies), was below established treatment thresholds in the spring of 2014 and at or above treatment thresholds in the fall". 2014 Provincial Apiarists report http://www.omafra.gov.on.ca/english/food/inspection/bees/14rep.htm#imp*

[iii] Scientific research and other resources on neonicotinoids. http://www.ontariobee.com/science

[iv] http://www.statcan.gc.ca/pub/96-325-x/2014001/article/11913-eng.htm#a3

[v] http://www.omafra.gov.on.ca/english/stats/crops/index.html

[vi] http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0010010&&pattern=&stByVal=1&p1=1&p2=31&tabMode=dataTable&csid=

[vii] http://ontag.farms.com/profiles/blogs/are-those-christmas-lights-in-ontario-nope-it-s-a-map-of-corn-red

[viii] http://www.omafra.gov.on.ca/english/about/beehealthpresentations/omafapiary.htm

[ix] http://stpp.ucla.edu/sites/default/files/Exposure_and_Interaction_2016_Web_0.pdf

[x] http://www.tfsp.info/worldwide-integrated-assessment/

[xi] http://www.tfsp.info/worldwide-integrated-assessment/

[xii] http://www.ontariobee.com/sites/ontariobee.com/files/PMRAreportOct2013U.pdf

[xiii] http://www.ipbes.net/article/press-release-pollinators-vital-our-food-supply-under-threat

[xiv] http://www.sciencedirect.com/science/article/pii/S0160412015301161

[xv] http://pubs.acs.org/doi/abs/10.1021/acs.est.5b03459?journalCode=esthag

[xvi] http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0125790

[xvii] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3264871/

[xviii] http://jeb.biologists.org/content/216/10/1799

[xix] http://www.pnas.org/content/early/2013/10/18/1314923110

[xx] https://palebluedot1.files.wordpress.com/2015/10/limay-rios-et-al_neonicotinoid-residues-in-soil-dust-and-associated-soil.pdf

[xxi] http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0108443

[xxii] http://www.ontariobee.com/sites/ontariobee.com/files/1-s2.0-S0269749114002802-main.pdf

[xxiii] http://stpp.ucla.edu/sites/default/files/Exposure_and_Interaction_2016_Summary_Web_0.pdfhttp://www.ontariobee.com/sites/ontariobee.com/files/Morrissey%20et%20al%202015_Review%20neonicotinoids%20surface%20water%20risk%20to%20aquatic%20invertebrates.pdf

[xxiv] **http://www.pollinator.org/beeissues.htm** .